

# VLEM JOURNAL



ARTISTS USING SCIENCE AND TECHNOLOGY

## NOTICE TO OUR READERS

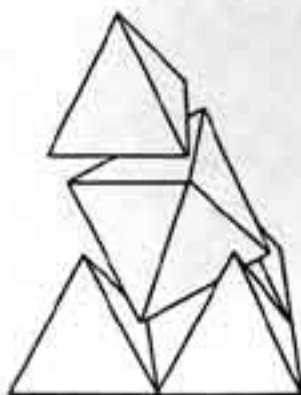
Late in 1985 the Ylem Board of Directors decided to switch from publishing a bimonthly newsletter to instead, a monthly Calendar. YLEM JOURNAL will alternate with an YLEM spread in Metier magazine.

Your monthly Ylem Calendar will keep you informed of current events and opportunities; the Journal will provide in-depth reviews, articles, and profiles—particularly profiles of the work and thought of Ylem members.

If you are not yet a member, or haven't renewed, see the "About Ylem" notes and membership form on the back pages.

Best Wishes,

Fred Stitt, Editor



COVER:  
"Me and My Shadow"  
Neon and glass sculpture  
by BEVERLY REISER

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This journal is published quarterly and distributed to members of YLEM.

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Contributions are most welcome. Drawings, graphic pieces, photos; explanations; submissions to Opportunities, Random Access, or Calendar; short book reviews or articles are also sought.



Theme poster fractal design for Fifth Annual Pacific Northwest Computer Graphics Conference  
APPLICATIONS ON THE LEADING EDGE (Fall, 1986)  
Designers: Alan Hartman, Richard Koch, Rodney Sitton



BY  
**Beverly Reiser**

## UPWARD PROFILES

**LIGHTS ON:  
SELF-ILLUMINATED SCULPTURE  
AT THE WALNUT CREEK  
CIVIC ARTS GALLERY**

The month of May, 1987, will see a show at the Walnut Creek Civic Arts Gallery titled, "Lights On! Self-Illuminated Sculpture". Each of the eight artists creates sculptures from light-emitting media such as neon, video screens or computerized light systems. Their work also shares the trait of being "kinetic", that is, changing in time. However, unlike an earlier kinetic movement, the work has no moving parts; it is simply the light that changes (brightens, dims, or changes hue). In fact, the sense of change or movement is achieved not by mechanical means but by electronic. Light emission and kineticism aside, the aesthetic intent of the artists varies from the apocalyptic to the meditative--passing playful along the way.

The Walnut Creek Civic Arts Gallery is located at 1641 Locust in Walnut Creek. The opening reception is April 29, 1987; for more information call (415) 943-5864.

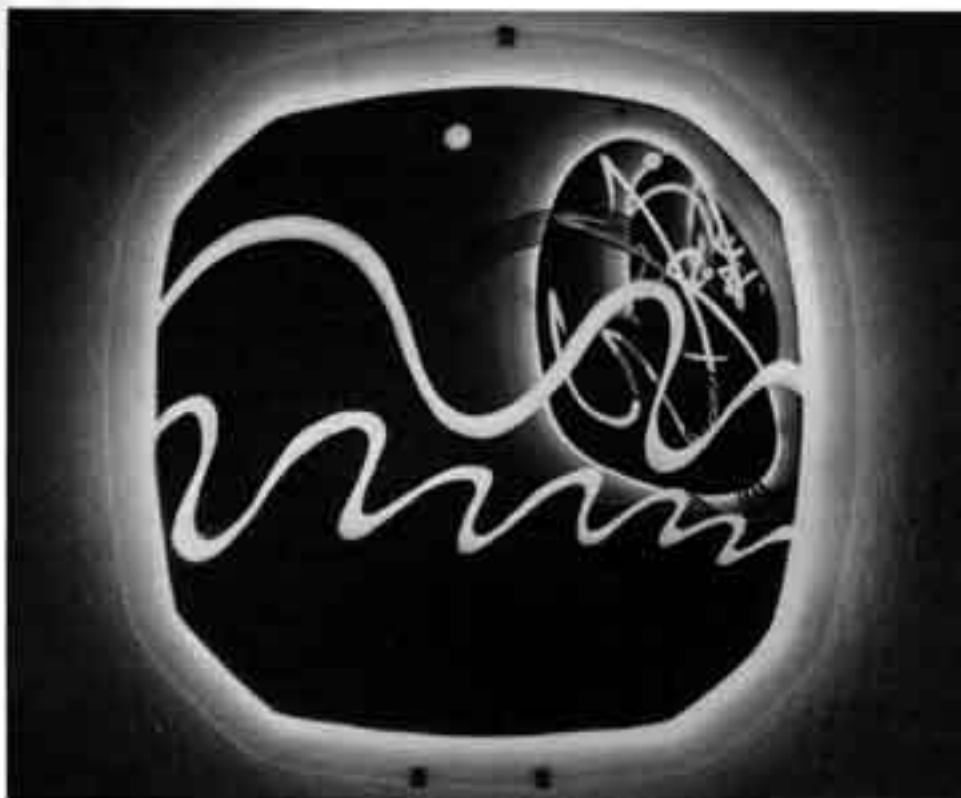
Milton Komisar achieves the effect of a 3-dimensional drawing in light by constructing an elaborate network of acrylic rods and hidden light switches. The light from hidden bulbs travels through the acrylic rods creating lines of light suspended in space. The lights are computer programmed to go "on" and "off" and change color, thereby creating an animated sculpture. While the sculpture passes through its seemingly endless sequences, the viewer is sometimes reminded of skeletal structures in nature or perhaps of the structure of the Universe itself.

Lee Roy Champagne has created a series of installation pieces called "Chapel Champagne, Shrine of Latter-Day Neon Nuanced Naivete". The individual room-sized works are referred to as "Altars" and, indeed, have an altar-like presence. Reminding us that art did originate as a magical religious ceremony, Lee Roy Champagne proceeds to hold up the mirror to contemporary

secular society, asking us if we like what we see.

Neon light is diffused through sandblasted glass and mirror in Beverly Reiser's wall pieces. The various colors of neon light wash into each other causing the glass to glow with soft gradations of color. There is a fluid quality to the compositions that is reminiscent of Oriental brush painting. Electronic circuitry controls the brightness, causing each color of neon to change brightness in different time cycles. This creates the impression of an infinitely changing mix of colors.

At least one video screen is employed in each of Alan Rath's video sculptures. Displayed on the screens are changing images, usually close-ups of human body parts -- blinking, throbbing, opening or closing. The electronic components of the pieces are deliberately left exposed to the viewer to call attention to the nature



"View from the Portal" by Beverly Reiser



"Voyeur" by Alan Rath

an innocent sense of wonder and magic.

Ed Duin uses the capacity of light to be broken up into its constituent colors by reflecting it off polarized surfaces. These polarized surfaces are arranged inside a light box about the size of a small TV. As the viewer moves, or the surface in the box moves in relationship to the viewer, the color of the surface appears to change -- thus achieving a kinetic color composition.

of the media producing the imagery, and to the media as imagery. They also seem to prod us to a greater awareness of the changing nature of our new tools.

Alan Marshall refers to the sequencing of his neon sculptures as choreography. A chorus of vertical neon tubes of varying degrees of brightness, causes the viewer's focus to shift as it follows the brightest tube. The constantly

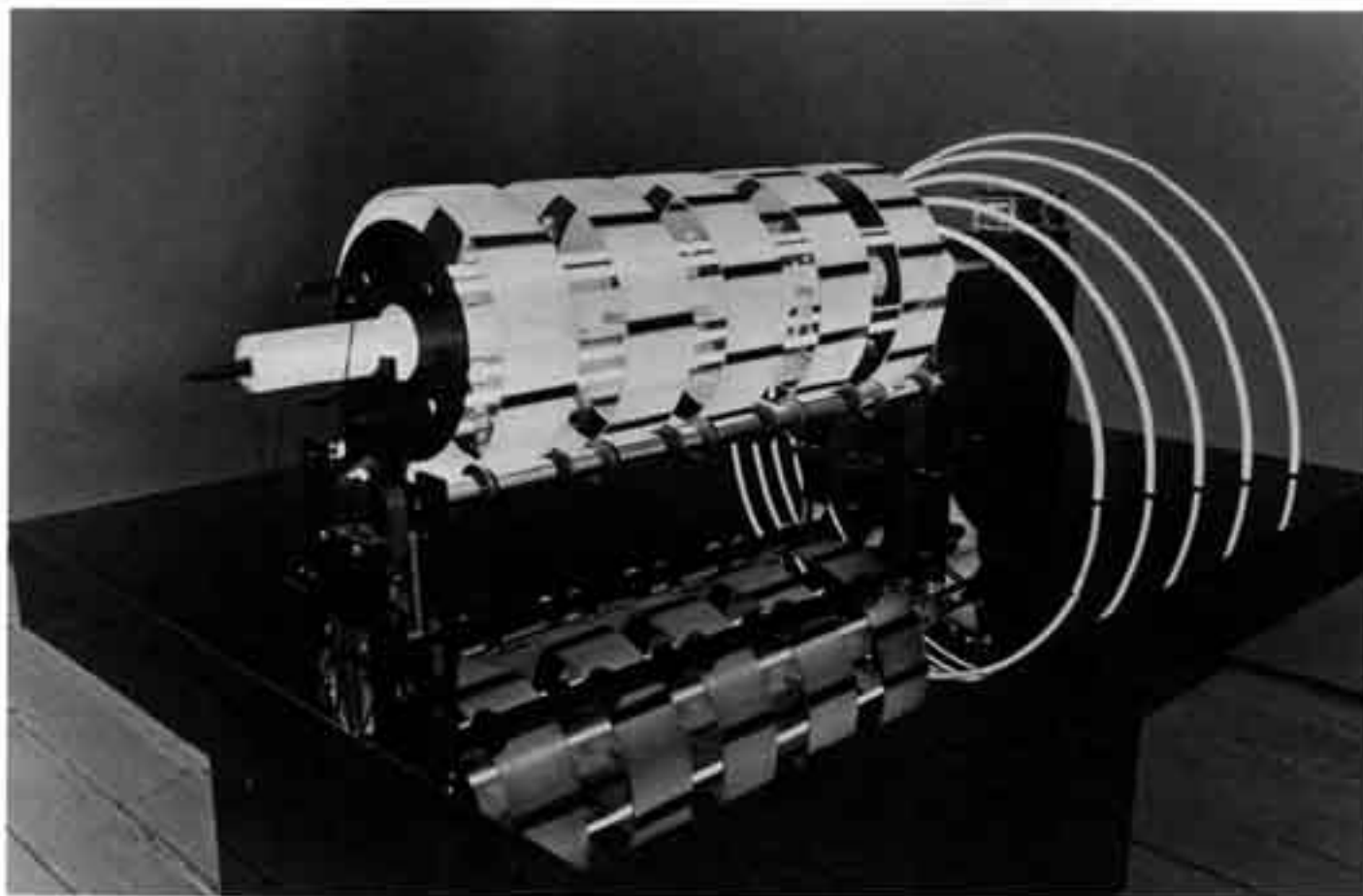
moving brightness of the light creates a sense of fluid movement and exchange between groups of tubes of light.

Larry Albright combines his own inventions using ionized gases and electronic circuitry with the best qualities of old-time electrical machines. They seem to be made in the spirit of objects once lavishly built as demonstration apparatus of the "Marvels of Nature" and convey

Ken Herrick constructs kinetic neon sculpture. Using special circuitry invented by him, many of his neon works appear to have glowing bubbles of neon gas traveling backwards or forwards, or both, within each tube. In some cases, the glowing bubbles increase their speed on cue from a sensor which has detected the viewer's presence or movement. The "agitated" behavior appears to be in response to the viewer.



"The Luminous Erototron" by Alan Marshall



**LIGHTS ON!: SELF-ILLUMINATED SCULPTURE**

by Milton Komisar, Lee Roy Champagne, Beverly Reiser, Alan Rath, Alan Marshall, Larry Albright, Ed Duin, Ken Herrick. April 30-May 31, Walnut Creek Civic Arts Gallery. Info: (415) 943-5864. Opening, Wednesday April 29th.

## LIGHT SCULPTURES by Ed Qum



"HAMMAGE" (17"W x 18"H x 18"D) ON PEDestal

The essence of these sculptures is change. There is internal movement and apparent change that occurs as the viewer moves. These artworks are a new dimension integrating light, color and movement. This slowly changing dynamic and viewer interaction are conveyed by the photos. Above is a side view. At right are front views showing the evolution of the image at different times.



INTERIOR IMAGE AT 15 SECONDS

INTERIOR IMAGE AT 30 SECONDS

INTERIOR IMAGE AT 45 SECONDS

INTERIOR IMAGE AT 60 SECONDS

## SHOOTING STARS GUILLERMO TROTTI

By Maeve Slavin



Guillermo Trotti arrived in Houston from Argentina in June 1969. A month later, Neil Armstrong took his historic "giant step". Trotti, who had enrolled at the University of Houston's College of Architecture, considers the event as a personally auspicious omen. "This was my big awakening to space," he says. As an undergraduate thesis, with fellow student John Dossey, in 1974 he presented plans and an elaborately documented scenario for a lunar colony called Counterpoint.

The project was supported by NASA and funded by the Houston Endowment. Buckminster Fuller shared his incomparable wisdom and knowledge as a godfatherly design critic. Models and drawings of Counterpoint were displayed at the University, the Museum of Natural Science and the Johnson Space Center in Houston, and were later exhibited at the Air & Space Museum in Washington, D.C. as part of the Smithsonian's bicentennial celebration. Counterpoint triumphantly launched Trotti's

career, placing him in the vanguard of architects who have seized the opportunity to pioneer man's future outside the domain of Spaceship Earth.

Counterpoint is imagined in the St. George Crater, the landing site of Apollo 15. From a skeletal crew of 15-20, it will eventually house a colony of some 200. Colonists and materials will be transported to the moon in three transit phases. Space shuttles will carry them on the first leg of the journey to Earth orbit. A lunar transport vehicle (LTV) will then move them to lunar orbit. Lunar tugs will dock with the LTV and transfer passengers and cargo to Counterpoint's landing pads.

Upon completion, which is estimated to take ten years, the base will consist of: three landing pads for space vehicles; above and below grade hangar and repair areas for space craft; a refinery and casting complex; power unit; food production and processing areas including farms for high protein plants and animals; a civic center for recreational, dining, religious and administrative activities; living quarters; and a laboratory.

Mining and processing lunar minerals believed to exist in comparative abundance close to the base site will make self-sufficiency feasible. From these resources a refinery will derive oxygen, water and building materials by electrolysis, catalytic cracking and smelting. Lunar basalt will be melted and cast to shape in the casting area. Tanks for storing fuel and chemicals will be faced with solar collectors to supplement energy production.

Power will be supplied by a nuclear reactor capable of producing 10,000 kwh of electricity. Using a heat exchanger coupled with a generator, this power unit will

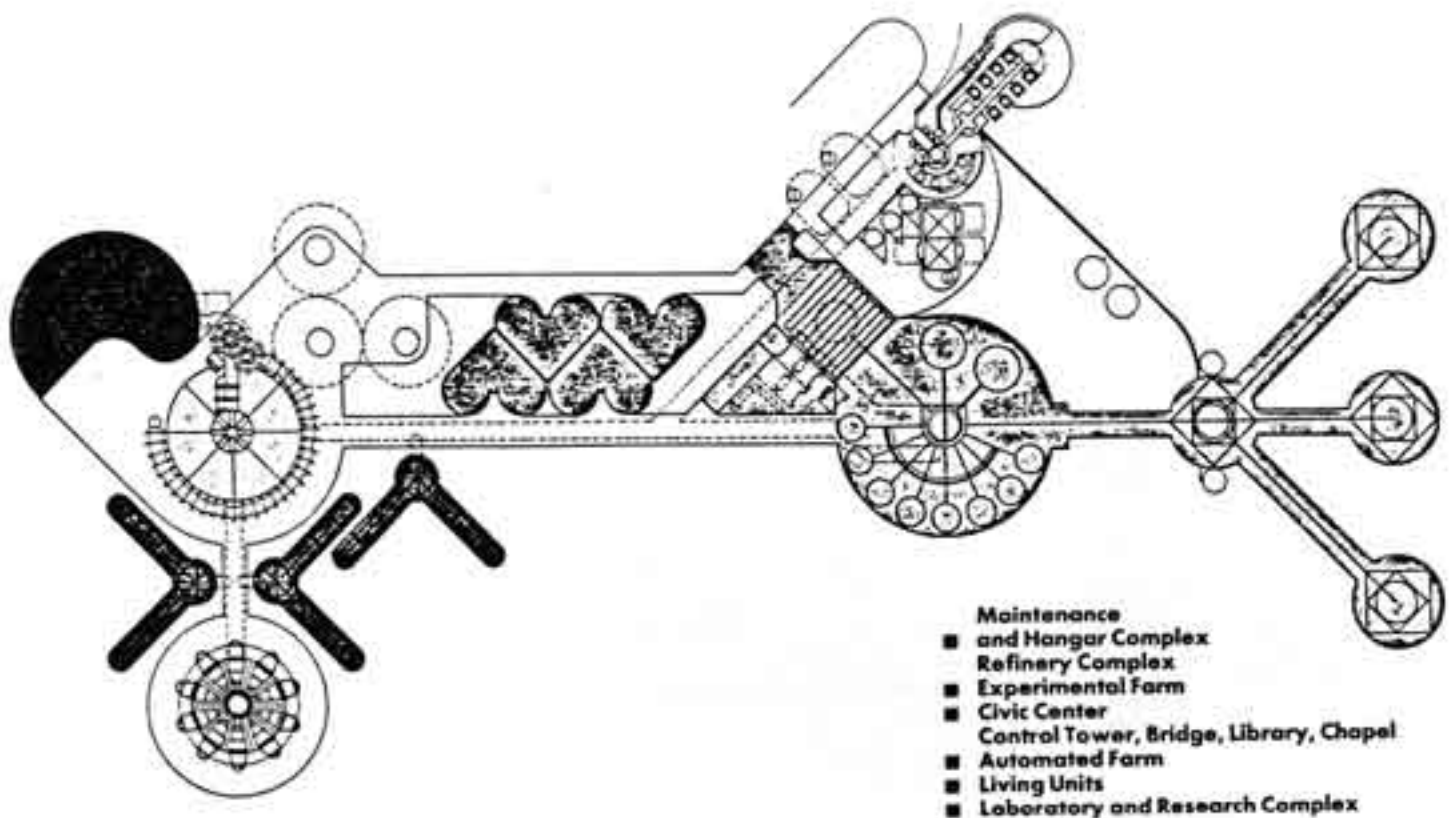
provide energy for oxygen (life support) systems, machinery necessary for ancillary functions and metals processing. An adjacent chemical mixer will produce water and other compounds. A fully automated Modular Integrated Utility System (MIUS) will manage the dispensation of power, water, atmosphere and waste for the colony.

An automated two-acre soybean farm will provide the staple food crop which will be supplemented by the produce of experimental farms where animals (chickens, goats and fish) and plants will be raised. Crops will be grown in soil trays equipped with plumbing which allows for recycling of water and nutrients.

Colonists are expected to remain at Counterpoint for periods of a year or longer. Therefore psychological problems caused by isolation from Earth's familiar stimulus and consolation must be anticipated and precluded. The multi-level Civic Center will provide the social interaction necessary for recharging the intellectual, spiritual, artistic, and physical batteries. There will be swimming pools, dining facilities, a theatre, fountains and places for lunar sporting events. A hologram sky will project images of earth on a semi-transparent dome. Since the lunar day lasts for 3543 hours with nights of similar duration, features will be programed into the Civic Center to produce shorter spans of light and darkness, cool and warmth, with humidity variations.

The central control tower thrusts through the dome of the Civic Center. In the bridge of the tower is the operational and administrative area which contains the computers controlling all life support functions of Counterpoint. Chapel and library pods will be suspended from a shorter tower standing outside the perimeter of the Center's dome.





Right: View of the approach to Counterpoint. Laboratory building in the background.

Far right: Counterpoint's Civic Center, Chapel and Library pods are linked by bridge to the Control Tower.



Structural systems and life enhancing factors explored in Counterpoint have become part of NASA'S data base for preliminary studies of lunar communities. Through the University of Houston's Environmental Center, Trotti and his colleague Larry Bell continue research in lunar architecture. Part of this work focuses on habitability

studies for space stations. Their conceptual design of a 100-person space station is premised on the principle of humanistic values. They are among the first architects in NASA'S engineer-driven programs.

They and others who invent the future can be sustained by Buckminster Fuller's epilogue to

Counterpoint. Urging solutions so simple that everyone will say "anybody could design that," Bucky wrote, "And they will never know what you went through-- how much God went through before evolving his hydrogen atoms and blades of grass and eggs."

## SHOOTING STARS LEBBEUS WOODS

by Maeve Slavin



Although Lebbeus Woods designed his Epicyclarium for Earth, like Michael Kalil he rests his thesis on the new physics. Contemporary scientists such as Stephen Hawking can now describe the Universe as a unified field of energy and matter. The advances of this research inexorably lead to voyaging far beyond the biosphere of Planet Earth. On Earth itself, an equally challenging adventure is projected: the quest for the Holy Grail of art, science and the humanities that has long fascinated the visionary.

Drawing upon physics, cosmology and electronic technology allied to the discipline of architecture, Woods proposes the establishment of a Center in which a synthesis of the entire field of knowledge can occur, leading to a comprehensive understanding of the Universe. The freedom to imagine such a possibility devolves essentially from quantum mechanical theories with their revolutionary principle of

probability. As an architect, Woods contributes an aesthetic that expresses a spirit of harmony and the new unity of form, idea and experience.

Woods explains the Epicyclarium as a structure composed of "simple forms and spaces which house the instruments of an advanced electronics technology, and the staff of creative scientists necessary to gather a vast and diverse body of knowledge." These highly trained specialists will assess this information and translate it into a two-dimensional "global image." In the darkness of the inner chamber, a 30-foot disc suspended above the floor continuously flashes fresh data which are gathered and fed to computers programmed to synthesize them into constantly changing configurations of light and color. The resulting data are simultaneously transmitted by microwave and satellite to receivers around the globe, thus creating a state-of-the-planet projection serving a range of cultural purposes.

The sum of the information is believed to be so richly diverse that much of it is yet to be fully understood.

The Epicyclarium plan follows a tripartite organization. A subchamber below grade contains equipment, workshop and laboratory space. The Lower Chamber is the receiving and observation area for the study of the image plate from below. Woods describes the Upper Chamber as "a theatre for procedures relating to the evolution of the image."

Woods envisions the use of basic construction materials which he considers appropriate to the spirit and activity of the Epicyclarium. Intentionally these metals and concrete will contrast dramatically with the high tech and cybernetic complexity of the instruments and

their function. The materials derive from the earth. In Woods' structure they are handled to the full extent of their inherent integrity. The concrete forms of the lower levels stand firmly on the earth, while the metal-sheathed dome "reflects the golden radiance of the Sun, Earth's source of life."

Woods works in traditional geometric forms but manipulates cube and sphere with sophisticated ease. Symbolism is generated with particular intensity where the sphere and the cube intersect at the level of the image plate, recalling the relationship between "the separate realms of earth and sky, the material and abstract, the visible and invisible, and their mutual source in the seamless fabric of nature."

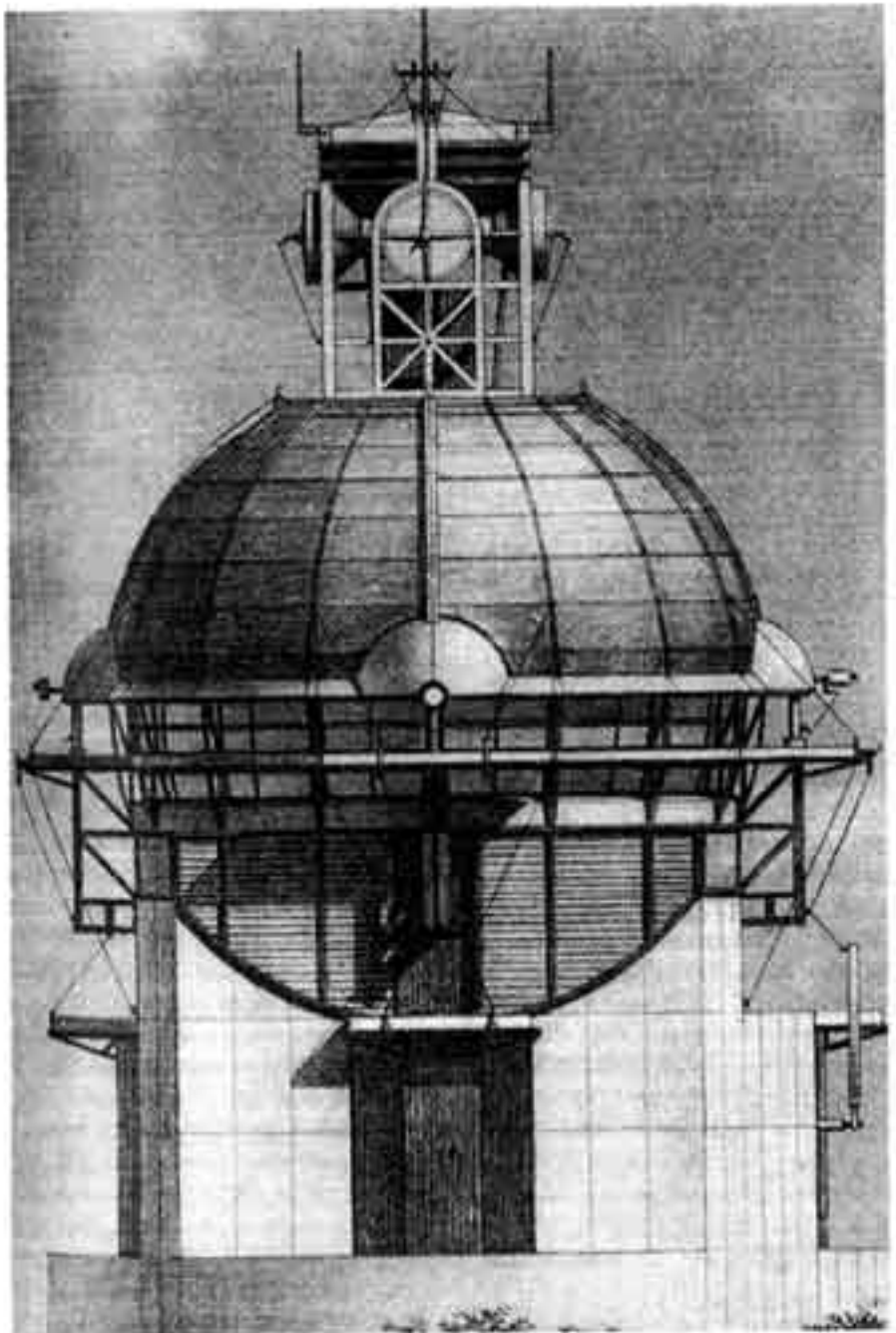
The project, although thoroughly documented and, in fact, already exhibited in New York at the Storefront for Art and Architecture, is still in the development stage. Woods, nevertheless, is firm that "tele-communications, computer theories, and technology anticipated along the lines of current research will be employed. Microchip design and manufacture, for example, will soon allow even more extreme miniaturization of the cells forming the image plate, producing a telescoping matrix of cells within cells resulting in a continuous image of great visual subtlety."

Until the completion of the Epicyclarium, and the beginning of its operations within the next decade, Woods can only speculate about the precise nature and form of the global image it will project. He notes: "The breadth and depth of contemporary knowledge of which the image will be composed is unprecedented, and it can be expected that forms of an entirely new order and content will emerge." Woods conjectures that "the

production of a contemporary global image will confirm ancient conceptions of the world. Archetypes known to earlier civilizations may appear. The image may be of landscapes and figures linked by either new or existing mythological schemes. It can even be imagined that a holistic projection may evolve, amounting to 'the many faces of God.'"

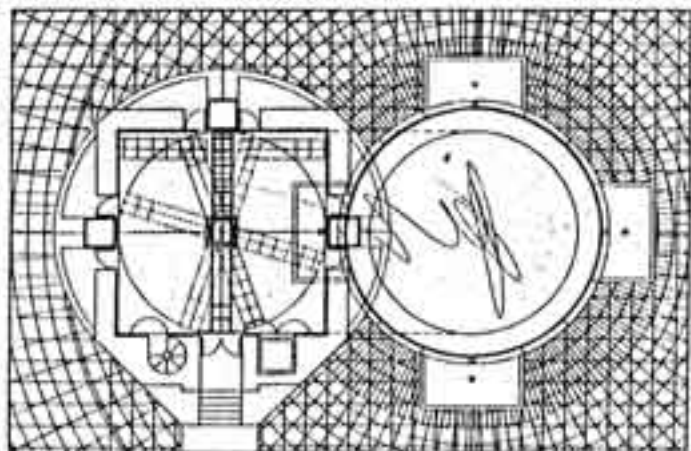
As the inventor and designer of the project, Woods believes, however, that "it is most likely that the electronically stimulated image plate will produce an abstract kaleidoscope of immense complexity, a cybernetic expression of the forces of change that move invisibly within the events comprising time and space."

Woods' Epicyclarium dares to confront the outer boundaries of architectonic skills, reaching toward an idealized role for designers as the prophets of the new reality proposed by physicists. Einstein reminded us that "God does not play dice with the Universe." In the holism of Woods' vision lies, perhaps, the clue to profound knowledge which will confirm Einstein's insight.



Upper right: Epicyclarium elevation drawn in pencil and pastel by Lebbeus Woods indicates relationship with earth and sky.

Lower right: Complex geometry is explored in the interior plan which shows upper and lower chambers linked by rotating stairs.





## SHOOTING STARS MICHAEL KALIL

by Maeve Slavin



In May 1984 *Interiors* published a breakthrough project by Michael Kalil: his prototype for a communications center applicable for earth or for orbit in space. Response to this interplay of primal geometry and elemental symbols continues to be the highest recorded in the magazine's ongoing reader reaction survey. Kalil's serene room, informed by a symbiosis of science and mysticism stripped down to the essence of proportion and scale, signifies a new direction for design, fresh vocabularies, and a mind-set as open to innovation as the Universe itself.

A new frontier lies in the vast uncharted regions of the Universe beyond the boundaries of Earth's biosphere. Penetration of this limitless expanse offers opportunity, adventure and hope to the people of the Earth. Excitement about the evolutionary possibilities inherent in space voyaging is sometimes mitigated by the sinister implication of their association with Star Wars budgets. But, as Buckminster Fuller taught us, military funding has made

possible many of the scientific, medical and technological advances of this century. Thus, for example, refrigeration plants were developed for the old Dreadnoughts, the wrist watch for the tank commanders of World War I, and wonder drugs like penicillin and techniques like laser surgery and nuclear medicine accrued from return on investment in defense programs.

The reality is that in the next decade, people will be living and working in space stations; early in the next century a lunar city will be in construction. The space shuttle will be used like a truck or a freight elevator to move people, materials and goods to and from points in outer space. The challenge for designers is immense, as "space planning" takes on new connotations just 15 years before the dawn of the third millennium. Michael Kalil, Lebbeus Woods and Guillermo Trotti are three visionaries who have grasped the new reality and who energize the definition of a new cosmology.

Michael Kalil and environmental theorist Jean Gardner have developed an architectural thesis for that new reality which they call quantum architecture. The term, with semiotic reference to quantum physics, is used metaphorically to re-establish meaning and value in architecture. Their research forms the data base for studies leading to the design of the habitation module in NASA'S space-station project.

Kalil and Gardner postulate that the primary issue in constructing a permanently-inhabited space station, is to establish the relationship of Individual and Place in Architecture.

The projected step from Earth to this station has created a new relationship between Individual and Place. No longer is Place limited to the Earth and its biosphere. Just as

astounding is the realization that although the station will be located in the earth's solar system, recent space discoveries expand our potential even beyond that system. Kalil and Gardner believe that this leap in conceptual as well as physical place has moved humanity into a new phase of biological evolution.

The fundamental properties and behavior of Individual and Place in Interplanetary Space exemplify the basis of that phase. Man's Earth-origins remain with him as earth, air, fire and water. Zero-gravity positions the individual in neutral body posture. Expressed geometrically as a sphere, this position is the seed from which an architecture for Space will grow organically as a visual echo of Individual and Place.

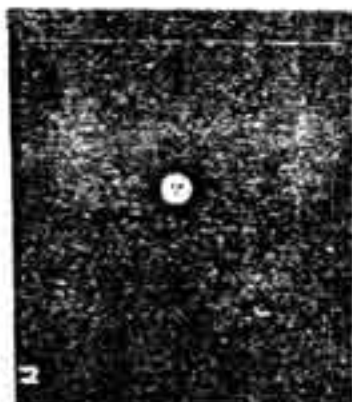
This proposition springs from their understanding of the evolutionary relationship of Individual and Place to Architecture. Their basic premise is the fundamental unity of the Universe. They refer to this unity at the subatomic level as the neutral vibratory field. They conclude that post-Einsteinian science is moving toward a unified conception of the Universe. This datum holds true of quantum physics, astrophysics, Jungian psychology, neuro-science, ecology and biology.

To demonstrate this evolutionary relationship they develop seven images.

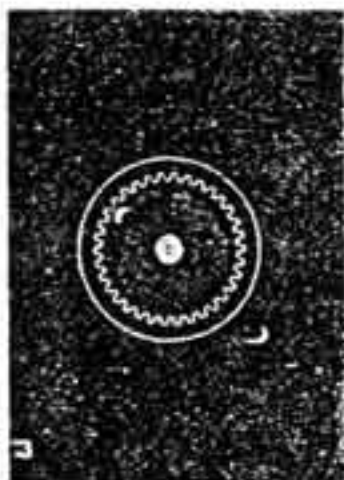


1. Here the properties and behavior of the underlying neutral

vibratory field are illustrated. Theoretical physicist David Bohm has analyzed this field as having an order which he describes as an enfolding one. The physical world unfolds from the unified field in such a way that seemingly independent parts are still actually interconnected.



2. Here, Desire unfolds the neutral vibratory field. The chemical elements of life (earth, air, fire and water) emerge, forming the seed from which organic life will grow.



3. These elements have combined to form Planet Earth within the Universe. The planet establishes the Architecture from which human life evolves as an intrinsic part of this living organism.



4. The image depicts an individual, who, becoming cognizant, aligns himself with his Universe, which is the living organism of the earth and its solar system. This act of decision springs from the resonance of five energy fields:

Desire directs the person towards light.

Light inspires him upward through gravity.

Gravity maintains his Earth origins.

Origins establish vision.

Vision aligns the individual to his Universe.

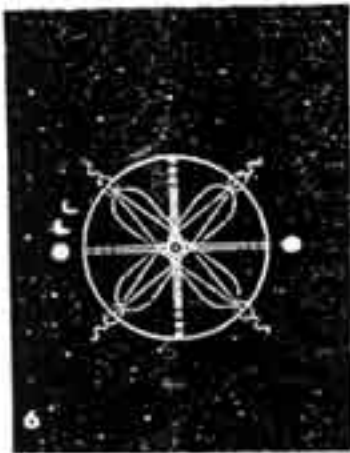
Based on the research of Karl Pribram, Stanford Professor of Neuroscience, Man's conscious alignment can be understood as a proportional arrangement of the neutral vibratory field. Our physical bodies receive vibrations from the field and transform them into our everyday reality by ordering them proportionally. The relationship between the physical world and the neutral vibratory field is similar to that of the part of a hologram to the whole. The part can reconstruct the entire image. Each part unfolds from the neutral vibratory field so it still contains the underlying order of the whole. A consequence is that the

whole determines the behavior and properties of relatively independent behaving parts such as Individual and Place,



5. This image depicts the Individual, who, recognizing his hologrammic relationship to the earth and its solar system, symbolized it by inventing geometry as a visual echo of ordered proportion. The resonance of gravity on the individual and the horizontal alignment of his eyes, isolates a segment of the earth's surface as the initial floor plane to his architecture. Embracing this relationship, he constructs that architecture as an embodiment of geometry and an organic celebration of his place within the Universe.





6. Having investigated the laws of the physical world, the individual elaborates geometry and architecture mechanistically. Through the energy of Desire he reaches the edge of the Earth's biosphere. His Universe expands beyond the Earth's solar system.



7. Now the individual moves into Interplanetary Space. His Earth-origins remain with him as his biological necessity for earth, air, fire and water. Zero-gravity positions him in a neutral body posture. This becomes the seed for the next phase of biological evolution in which his architecture will be a visual echo of the properties and behavior of Individual and Place, a reflection of the order of the underlying neutral vibratory field, and an organic response within a Universe that is a

single living organism.

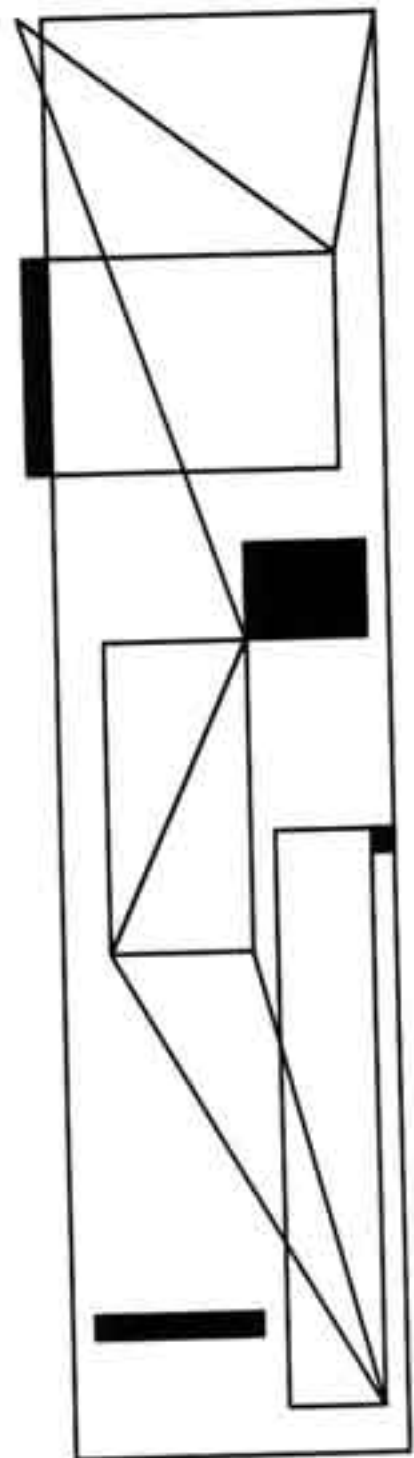
To guide the formation of a quantum architecture, Kalil and Gardner invent four principles:

Desire activates the neutral vibratory field toward proportional arrangements.

Proportional arrangements of the activated field order resonant properties and behavior of Individual and Place.

Resonance of Individual and Place orders vibratory properties and behavior of proportional arrangements from the activated field toward their Visual Echo, which is Architecture.

The theory of quantum architecture sparks an expansion of consciousness which confirms the individual's innate sense of unity with the Universe. Architecture is shown to be a fundamental characteristic of the individual as he recognizes his place in the dynamics of evolution toward the stars.



Plotter drawing by Josepha Haveman

## THE NEW TECHNOLOGY ART IN AMERICA SERIES

New and uncommon technologies are playing an increasingly vital role in the fine arts; the potentials and limitations of these technologies help shape both the artist's vision and the way that vision is expressed.

This series of exhibitions will showcase some of the technologies being used today by visual artists throughout the United States. Exhibitions will range from works based on unusual paints and lighting techniques, to the latest breakthroughs in computer and electronic art.

As a public relations agency in the area of technology, communication, High-Tech—with the support of artists, art galleries, art consultants, and curators nationwide—is an appropriate venue for this display of the growing partnership between art and technology.

Hi-Tech Public Relations, Inc., San Francisco, will exhibit the work of seven Bay Area artists who have substituted computer technology for paintbrush, chisel, and loom.

The exhibit is the second in Hi-Tech's "New Technology Art in America" series, and will feature the art of Susan Brown, Donna Cohen, Eduardo Gutekunst, Josepha Haveman, C. William Henderson, Trudy Myhr Reagan, and Jeffrey Sully. It can be viewed Monday through Friday, May 4 - July 31, 10 a.m. - 5 p.m.

The exhibit demonstrates how artists can apply their skills to the new electronic medium.

Susan Brown uses her skills as a weaver to create intricate, fabric-like designs. Brown sketches her patterns, transposes them onto graph paper, then translates the sheet into a matrix of code numbers. This becomes the basis for a

FORTTRAN program she has written, running on a CDC 844 computer and outputting to a 4-pen Nicolet plotter.

Donna Cohen produces her work using Easel software on a CompuPro computer with Digital Graphics CAT-800 frame buffers. The images are reproduced on Cibachrome film by a Rembrandt 3500C camera.

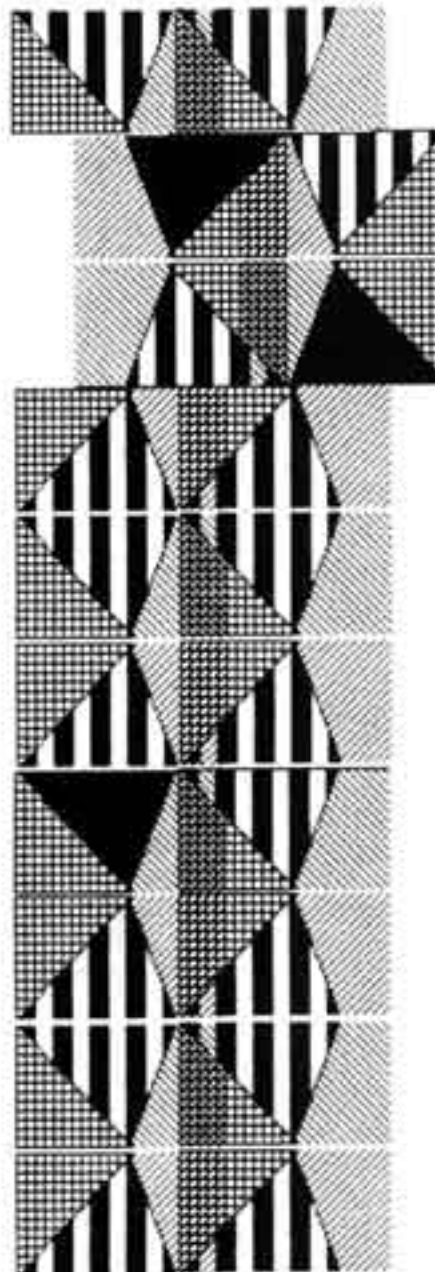
Eduardo Gutekunst uses the Quantel Paintbox and Ampex paint systems to create intricate works that blend abstraction and sensitivity to Nature.

Josepha Haveman explores the problems of structure and form, creating spatial illusion with the use of a few lines and colors. Hers is a PC-based system running Easel software. Hardcopy is produced by inkjet color printer.

C. William Henderson begins with abstract, black-and-white photographs. He digitizes them into the computer where they appear as 64 levels of greyscale. He then manipulates them and remaps the grey tones into color using the Lumena paint system. Color output is produced by a Xerox C-150 inkjet printer.

Trudy Myhr Reagan, the founder of YLEM, shapes shiburi paper into forms that resemble surface features of the Earth's crust. She then scans these into a Via Video System One computer and uses UltraPaint software to color-enhance the images. Her output is to 35mm color slides and Cibachrome prints.

Jeffrey Sully's computer art derives in part from his experience with painting and sculpture. He uses a Lumena Studio System, which includes an IBM XT-compatible computer, monochrome and RGB monitor, and Lumena/8 software.

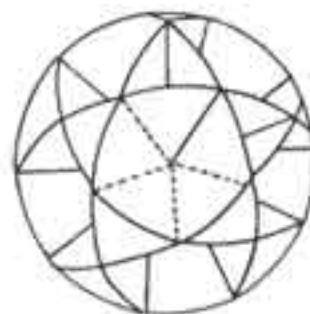


Ink-jet print by  
Josepha Haveman

He hand-colors Cibachrome prints with special markers to achieve added richness.

Hi-Tech Public Relations, Inc., specializes in technology communications. The agency undertook the "New Technology Art in America" series to show how new technologies are influencing the fine arts.

INFO: Dare Michos, Curator  
Dare to Collect, (415) 851-0426



## MATH PATTERNS, NATURE'S PATTERNS

by Gertrude Myhr Reagan



### MATH HIGH

In a thickly wooded area of Menlo Park, the Victorian mansion of Peninsula School was the setting for the January Ylem Forum. As is our tradition, we brought art to share, and it filled the walls. Wires from audio-visual equipment covered the stage. And math models, colored paper and bobby pins (bobby pins??) filled the tables.

Some folks get high on 3-D, some on animation, some on light. This audience was here for a math high. Since these math kicks don't translate into holograms, computer videos, or neon sculptures, not many people are aware that such people exist in Ylem. Yet they do form an active international constituency of the club.

### GREAT CIRCLE SPHERES

Bobby pins were first on the program, part of the demonstration of Bucky Fuller's great-circle geometry. Fuller's work is but one set of geometric ideas that Mary Laycock teaches to gifted children at Nueva Learning Center in Hillsborough using math manipulatives.

Here, Laycock showed how to make

bowties. She chose to do one intermediate in difficulty between the two in her book, "Bucky for Beginners". I was doubtful that 35 of us could assemble something this confounding in 20 minutes, but four circles and twelve bobby pins later, we all had 35 open-work balls with six square faces and eight triangular ones.

Looked at another way, (see illustration), the project gives the appearance of being made of four intersecting circles. Laycock received Fuller's personal permission to use his bowtie idea in her teaching, as it turned out, only two weeks before his death.

The same idea can be used to make much more complicated models, such as the large globe of dowels at the exploratorium. Laycock herself had made some fantastically intricate ones as large as soccer balls. "That's how I spend my Hawaiian vacations".

### RAPHAEL AND MATHEMATICS

The next presentation by Stanley Cotter, was as theoretical as Laycock's had been tangible. One painting sufficed to show the high regard the Renaissance artists had for philosophy. It was Raphael's

including Pythagoras) converse in an airy edifice as lofty as St. Peter's. The arched design Raphael used was, in fact, Bramante's original design for that building. Hidden principles govern Raphael's division of space and placement of the figures.

Deep in discussion, the philosophers point to diagrams such as the numerical values of musical intervals discovered by Pythagoras. Raphael used "ideal proportions" to lay out the composition: 1:2, 2:3, 3:4, and the Golden Mean (the ratio, 1:1.618), proportions from the work of Leone Battista Alberti who had studied Greek treatises and architectural ruins 75 years before (1440). Alberti had derived visual ratios from the musical intervals! "In the Renaissance", said Cotter, "the greatest philosophers were artists". Their theories were Pythagorean, their cosmology was of "God the Geometric", whose understanding would come from examining the natural world.

When asked about his "Mathematics and Culture" course at Foothill College, he said sadly, "The demand has been for only practical courses since about 1983".

Three of them were open in the center, which made them unlikely candidates. Others were pyramids and irregular seven-sided shapes with non-standard angles. Still others, semi-regular polygons. Which to eliminate? "To tell the truth, they all fill space." The pyramids proved to be one-fourth parts of a cube, and two seven-sided objects were one cube cut on the diagonal, in an odd way. "If you chop off these projections on the truncated octahedron here, and put them over here, you get a cube as

well." On the other hand, the rhombic dodecahedron stacked up in 30-60 degree angles.

Each of the models that were vacant in the center had faces that came off. In this way he could insert and neatly nest identical ones at various angles to fill the central hole. A 3-D chain! Relentless growth! His pride and joy was one that he himself had invented in this genre.

How mathematics relates to patterns in nature was only hinted at on this

occasion by the crystallographers. Much more could be demonstrated, both with computer models and natural specimens. It is an important subject for artists. For a century, photography has made the manual ability to capture the surface appearance of nature superfluous. But revealing the hidden structure of what we see, "seeing pattern" behind the surface and within the object is the role of the artist in the mathematician and the mathematician in the artist.



"ISTHMUS" by Gertrude Myhr Reagan



## Ylem Membership Application

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

PHONE: DAYTIME \_\_\_\_\_ EVENING \_\_\_\_\_

If joining, please also complete the section below.

Send to: Ylem, P.O. Box 749, Orinda CA 94563

☐ to receive a sample issue

☐ \$20 year's membership

☐ \$15 student membership

☐ \$15 newsletter only  
U.S. Dollars only please

## Ylem Membership Update

Dear Members,

We are in the process of updating our files on Ylem members. We need your help to make it possible for us to compile our "Yellow Pages." Please complete this page for us. Also if you have samples of your work, we would be very interested in seeing them.

NAME \_\_\_\_\_ ADDRESS \_\_\_\_\_

### ARTISTIC MEDIA

Please mark 1 or 2. Beside each, please state in 26 letters your specialty. (i.e. : "illus. + images on cloth," "hi-res computer modeling," "bronze casting.")

\_\_\_ conceptual art:

\_\_\_ computer graphics/computer assisted art:

\_\_\_ crafts:

\_\_\_ exhibits/performance planning:

\_\_\_ graphic design:

\_\_\_ kinetic/interactive light or sound:

\_\_\_ music:

\_\_\_ 2-D fine arts (i.e. painting, printmaking, illustration, photography):

\_\_\_ 3-D fine arts (i.e. sculpture, architecture):

\_\_\_ video/film:

\_\_\_ writing:

\_\_\_ multi-media (hi-tech):

\_\_\_ multi-media (not hi-tech)

\_\_\_ other hi-tech

\_\_\_ other

**AREAS OF INTEREST:** ( Do not duplicate info. listed above.) Circle two.

\_\_\_ Aesthetics

\_\_\_ Architecture

\_\_\_ Computer Graphics

\_\_\_ Computer Science

\_\_\_ Education

\_\_\_ Engineering

\_\_\_ Hi-tech Media

\_\_\_ Mathematics/Puzzles

\_\_\_ Natural Sciences: Biology, Geology, Botany

\_\_\_ Pattern and Structure

\_\_\_ Perceptual phenomenon/Visualization

\_\_\_ Psychology

\_\_\_ Physics, Chemistry

\_\_\_ Space, Astronomy, Cosmology

\_\_\_ Societies/Culture

\_\_\_ Universe/Mind

On an additional piece of paper please include what your artistic philosophy is (one paragraph only) and in what areas could technical assistance from Ylem members be useful in your work.

Send to: Ylem, P.O. Box 749, Orinda CA 94563



# WHAT IS YLEM?

By Fred Stitt

Simple. "Ylem" is the primordial stuff from which the universe was created. (Pronounce it "Eye-lum" and you've got it.)

It's also a thriving organization of artists and art lovers who are enamored of science and technology.

That particularly means artists who work with video, ionized gases, computers, lasers, holograms, and other non-traditional media.

It also includes artists who use traditional media but who are inspired by the images, structures, and growth geometries of crystals, electromagnetic phenomenon, and biological self-replication.

The Ylem organization helps keep members informed of opportunities to show their work in upcoming exhibits, competitions, conferences,

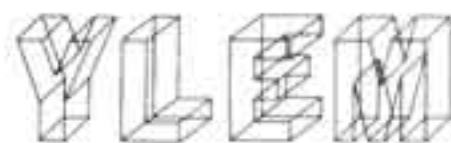
etc. It also publicizes and shows off members' work through its own publications and events. The active membership includes many well-known bay area figures in the arts and gallery world as well as collectors, educators, students, engineers, architects, and scientists.

Diverse techno-aesthetic interests are demonstrated quarterly at the YLEM FORUMS held alternately in San Francisco and on the Peninsula. They include presentations by practicing scientists who appreciate the aesthetic values within their disciplines and artists who enjoy the science and technology that underlies all art.

The Ylem Forums are hosted by Ylem founder Trudy Myrrh Reagan. Trudy almost single handedly nurtured and guided Ylem through the past few difficult formative years, providing a newsletter, field trips, expansive networking among hundreds of Ylem members, and the always amazing Forums.

Ylem also publishes a monthly Calendar - devoted to news of Forums, field trips, gallery openings, exhibits, presentations, parties, opportunities, and what-have-you.

Subscriptions to the Journal and the Calendar come with membership which costs \$20 per year (subscription only is \$15). You can join/subscribe or get a free sample of each by writing to Ylem, Box 749, Orinda, CA, 94563. Or for more information, call the President of Ylem, well-known glass and neon artist Beverly Reiser, (afternoons only) at (415) 482-2483.



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SCIENCE &  
TECHNOLOGY  
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